Living Environment (Unit – Ecosystem) Name

*Task & Assessment for Ecosystems & Human Impact Unit* Date:

**Topic: Final Project. The Impact of an Amusement Park on a Natural Environment**

**Aim: How do people impact or effect the changes in ecosystem?**

**Objectives: SWBAT**

* **Apply acquired knowledge of the unit to the performing activity**
* **Hypothesis the impact of humans on the changes in ecosystem**
* **Analyze the ways how to decrease human disruption of the natural ecosystems**
* **Write a summary on what you think is more important either to construct an entertainment park or preserve the natural landscape.**

**Essential Questions**

a. How do we organize organisms by energy attainment?

b. Explain how organisms interact and depend on each other for survival.

c. How will ecosystems adapt, change, or remain the same into the future?

d. Why are humans considered the most disruptive organism on Earth?

**Standards / Performance Indicators (Unit – Ecosystems)**

Key Idea 1: Living things are both similar to and different from each other and from nonliving things.

1.1 Explain how diversity of populations within ecosystems relates to the stability of ecosystems.

1.1a Populations can be categorized by the function they serve. Food webs identify the relationships among producers, consumers, and decomposers carrying out either autotrophic or heterotrophic nutrition.

1.1b An ecosystem is shaped by the nonliving environment as well as its interacting species. The world contains a wide diversity of physical conditions, which creates a variety of environments.

1.1c In all environments, organisms compete for vital resources. The linked and changing interactions of populations and the environment compose the total ecosystem.

1.1d The interdependence of organisms in an established ecosystem often results in approximate stability over hundreds and thousands of years. For example, as one population increases, it is held in check by one or more environmental factors or another species.

1.1e Ecosystems, like many other complex systems, tend to show cyclic changes around a state of approximate equilibrium.

1.1f Every population is linked, directly or indirectly, with many others in an ecosystem. Disruptions in the numbers and types of species and environmental changes can upset ecosystem stability.

Key Idea 6: Plants and animals depend on each other and their physical environment.

6.1 - Explain factors that limit growth of individuals and populations.

6.1a – Energy flows through ecosystems in one direction, typically from the Sun, through photosynthetic organisms including green plants and algae, to herbivores to carnivores and decomposers.

6.1b – The atoms and molecules on the Earth cycle among the living and nonliving components of the biosphere. For example, carbon dioxide and water molecules used in photosynthesis to form energy-rich organic compounds are returned to the environment when the energy in these compounds is eventually released by cells. Continual input of energy from sunlight keeps the process going. This concept may be illustrated with an energy pyramid.

6.1c – The chemical elements, such as carbon, hydrogen, nitrogen, and oxygen that make up the molecules of living things pass through food webs and are combined and recombined in different ways. At each link ina food web, some energy is stored in newly made structures but much is dissipated into the environment as heat.

6.1d – The number of organisms any habitat can support (carrying capacity is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle the residue of dead organisms through the activities of bacteria and fungi.

6.1e In any particular environment, the growth and survival of organisms depend on the physical conditions including light intensity, temperature range, mineral availability, soil/rock type, and relative acidity (pH).

6.1f Living organisms have the capacity to produce populations of unlimited size, but environments and resources are finite. This has profound effects on the interactions among organisms.

6.1g Relationships between organisms may be negative, neutral, or positive. Some organisms may interact with one another in several ways. They may be in a producer/consumer, predator/prey, or parasite/host relationship; or one organism may cause disease in, scavenge, or decompose another.

6.2 – Explain the importance of preserving diversity of species and habitats.

6.2a – As a result of evolutionary processes, there is a diversity of organisms and roles in ecosystems. This diversity of species increases the chance that at least some will survive in the face of large environmental changes. Biodiversity increases the stability of the ecosystem.

6.2b – Biodiversity also ensures the availability of a rich variety of genetic material that may lead to future agricultural or medical discoveries with significant value to humankind. As diversity is lost, potential sources of these materials may be lost with it.

6.3 Explain how the living and nonliving environments change over time and respond to disturbances.

6.3a The interrelationships and interdependencies of organisms affect the development of stable ecosystems.

6.3b Through ecological succession, all ecosystems progress through a sequence of changes during which one ecological community modifies the environment, making it more suitable for another community. These long-term gradual changes result in the community reaching a point of stability that can last for hundreds or thousands of years.

6.3c A stable ecosystem can be altered, either rapidly or slowly, through the activities of organisms (including humans), or through climatic changes or natural disasters. The altered ecosystem can usually

**CCLS Reading for Informational Text: Key Ideas**

RST.9-10.1

Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

RST.9-10.2

Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

RST.9-10.3

Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

CCLS Reading for Informational Text: Craft and Structure

RST.9-10.4

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

RST.9-10.5

Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

RST.9-10.6

Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.

Reading for Informational Text: Integration of Knowledge and Ideas

RST.9-10.7RST.9-10.8

Assess the extent to which the reasoning and evidence in a text support the author’s claim or a recommendation for solving a scientific or technical problem.

RST.9-10.9

Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.

Reading for Informational: Range of Reading and Level of Text Complexity

RST.9-10.10

By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**Writing: Text Types and Purposes**

WHST.9-10.1

Write arguments focused on discipline-specific content.

• Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.

• Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline- appropriate form and in a manner that anticipates the audience’s knowledge level and concerns.

• Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.

• Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

• Provide a concluding statement or section that follows from or supports the argument presented.

WHST.9-10.2

Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

• Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.

• Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.

• Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.

• Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.

• Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

• Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

WHST.9-10.3

Students’ narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in

**Key Vocabulary for Unit:**

HETEROTROPH = CONSUMER [insect] - An organism that obtains energy by eating other organisms

AUTOTROPH = PRODUCER [oak tree] - An organism that obtains energy by making its own food

HERBIVORE [cow] - A heterotroph that consumes mostly autotrophs

CARNIVORE [lion] - A heterotroph that consumes other heterotrophs

OMNIVORE [bear] - A heterotroph that consumes both autotrophs and heterotrophs

DECOMPOSER [bacteria + fungi] - Organism that consumes dead material or wastes and returns nutrients to environment

SAPROTROPH [maggots] - Organism that consumes dead material

DETRIVORE [cat fish] - Organism that eats detritus (dead materials or wastes)

SCAVENGER [vulture] - Similar to a carnivore but usually doesn’t kill the heterotroph

PREDATOR / PREY [cheetah/gazelle] - Eater and eaten

PARASITE [tape worm] - Organism that consumes another organisms

**Project on summarizing of the acquired knowledge of the Unit – ECOLOGY**

**“The Impact of an Amusement Park on a Natural Environment”**

**Background**

Amusement parks are built for all ages; children love to play, families share laughter, and even adults feel young again on the rides. Cotton candy, popcorn, and other delicious smells fill the air to create a unique environment.

But what happened to the environment that was there before the amusement park? Where did the animals, birds, insects, and plants go? Will the rain still seep into the soil and will the air remain clean? Are humans evil when they build over natural environments? Is the amusement park worth more than an empty lot or a group of trees?

**Task**

Perform an analysis of the natural environment before the construction of the amusement park. This will involve identifying abiotic and biotic factors, arranging organisms into an energy pyramid, and developing a complex food web.

The second phase is describing the effects of the development on the natural system. Discuss how human impact will affect the abiotic and biotic factors. Explain how a complex food web may be disrupted, and predict the future of the native organisms.

Thirdly, prepare a document that supports construction of the amusement park, or challenges the plan of the amusement park. Cite evidence from your ecosystem analysis to support or refute the construction. Discuss the impact that human development has on natural areas. Hypothesize the future ecosystem that will exist after the amusement park is construction. Create a balance between human development/entertainment, and the natural environment.



**Part A – Identifying Abiotic and Biotic Factors in a Natural Environment**

*Choose a city park, identify its location, and create a diverse list of ABIOTIC and BIOTIC factors below.*

1. Name of park:

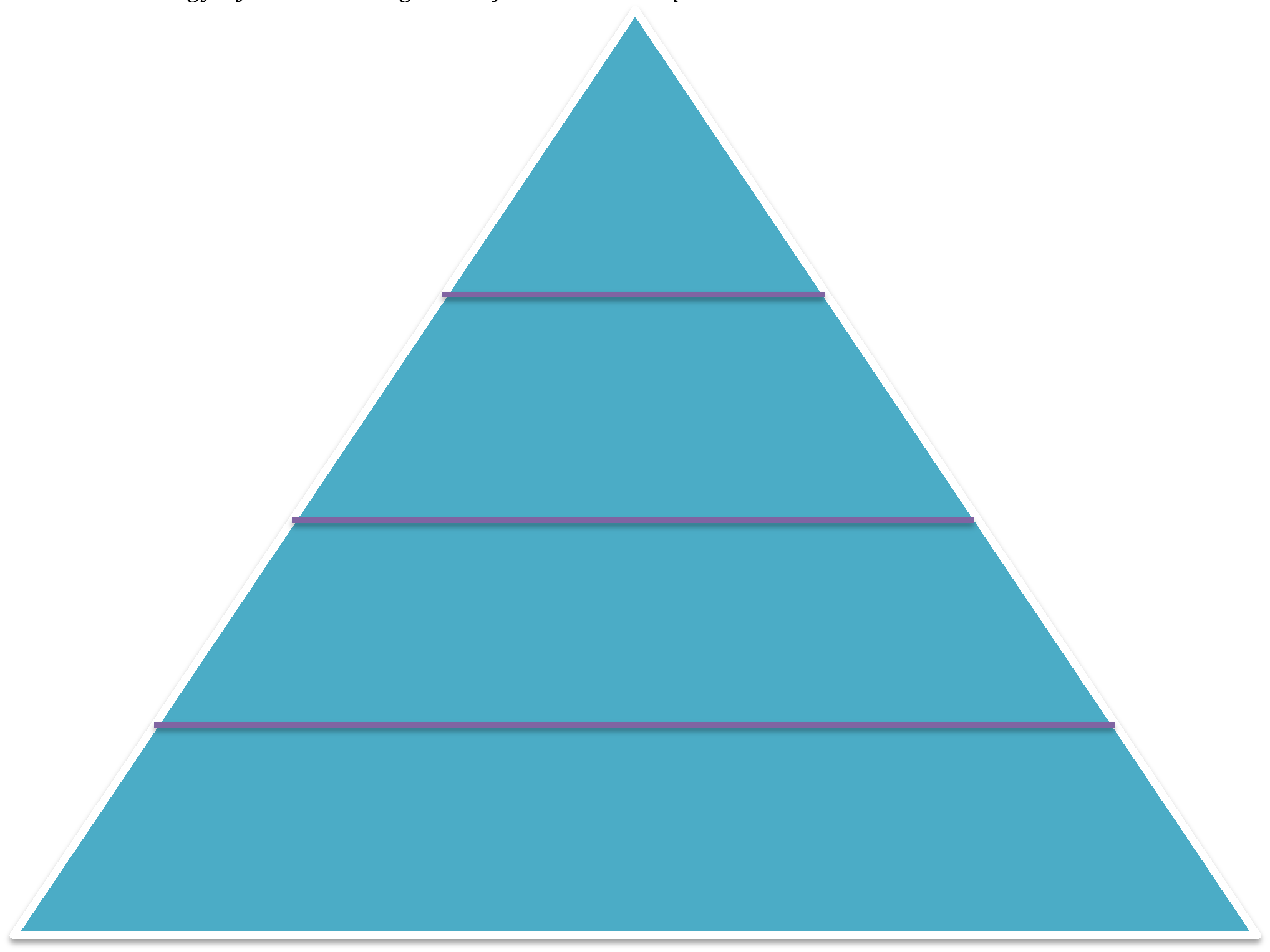
2. Address:

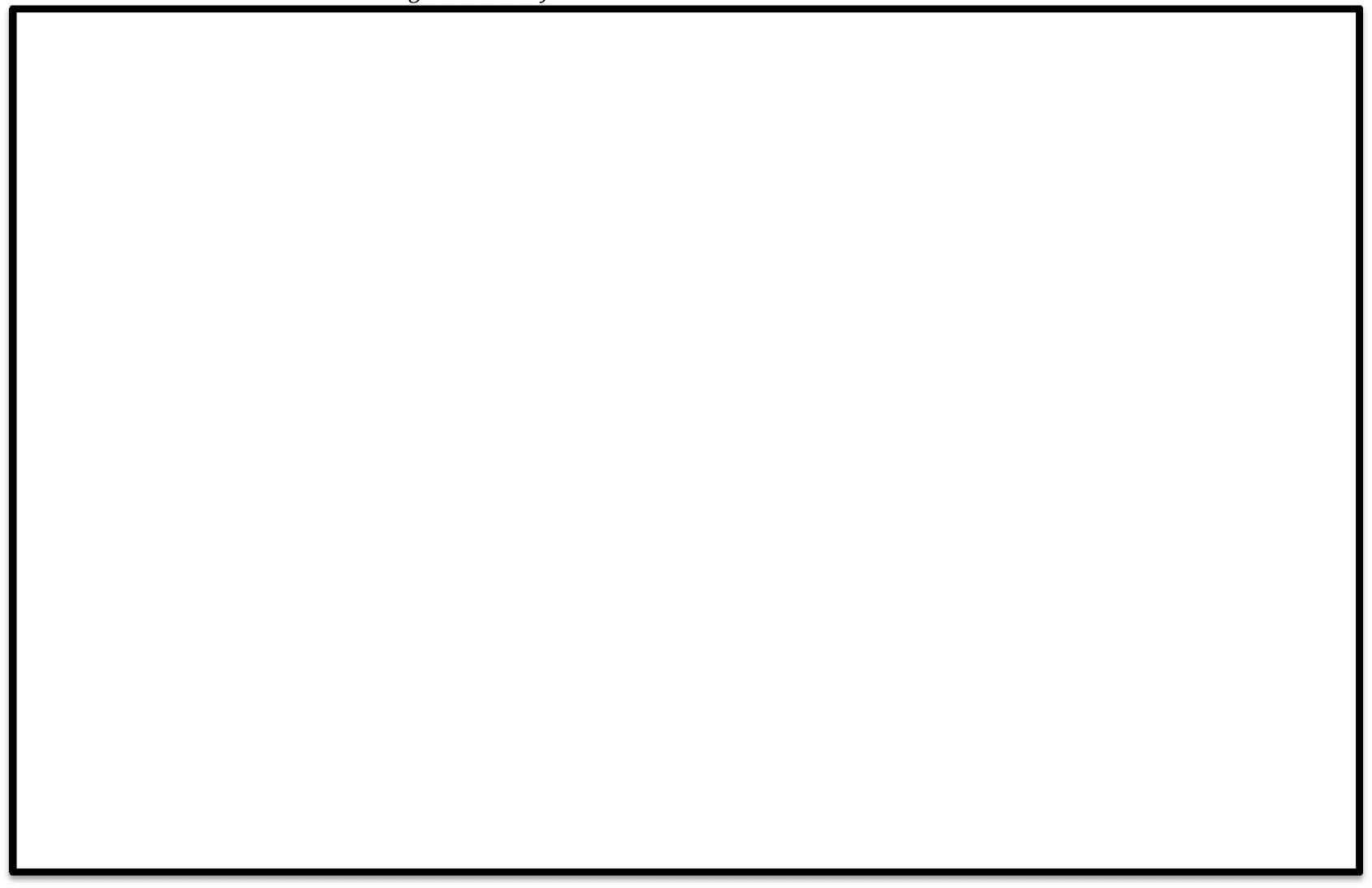
3. Approximate Size (in blocks):

|  |  |
| --- | --- |
| **ABIOTIC FACTORS** | **BIOTIC FACTORS** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Part B – Organizing Biotic Factors into a Food Web and Energy Pyramid**

*Create an Energy Pyramid sorting biotic factors into trophic levels:*



*Create a Food Web involving the biotic factors:*

**Part C – Choosing 2 Biotic Factors and 2 Abiotic Factors that will be influenced by Human Impact**

1. Choose 2 **biotic** factors: and

*2. How will each of these organisms be affected by human development? Refer to your food web to identify problems.*

3. Choose 2 **abiotic** factors: and

*4. How will each of these factors be affected by human development?*

**Part D – Human Impact on Global Temperatures**

1. Identify the main global warming gas that humans release into the atmosphere and a source of this gas.

2. Explain how development of an amusement park may increase the amount of this gas.

3. Describe how the increase in greenhouse gases leads to increasing temperatures worldwide.

**Part E – Propose a Solution to Minimize Amusement Park Development**

Considering the Energy Pyramid, Food Web, and factors identified in Part C, suggest solutions for minimizing the effect of the amusement park development on the natural environment.

**Part F – Promoting Your View**

Based on your analysis AND personal viewpoint, do you suggest that an amusement park be built in place of a natural area near your home. Support your view with at least 3 pieces of evidence from your ecosystem analysis and support your personal views with reasoning.

**ASSESSMENT RUBRIC – STUDENT REVIEWED**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **4 - EXCELLENT** | **3 – GOOD** | **2 - OKAY** | **1 – NEEDS IMPROVEMENT** |
|  | *100-85%* | *85-75%* | *75-65%* | *<65%* |
| **8TH GRADE ELA**  **LEVEL** |  |  |  |  |
| **AMOUNT OF**  **WRITING – COMPLETE SENTENCES** | All complete, student  writes in complete sentences and supports answers with evidence | Most work complete,  student writes in complete sentences and supports answers | Most work complete,  students writes in complete sentences, sometimes supports answer | Student writes in  phrases/1-word answers, does not support answer |
| **UNDERSTANDING**  **OF ABIOTIC/ BIOTIC** | Student identifies 6  abiotic & biotic factors specific to the park, and uses a variety of factors | Student identifies 6  abiotic & biotic factors related to the park | Student identifies 4  abiotic & biotic factors that may be in the park | Student identifies 4  abiotic & biotic factors, may not be from the area |
| **ENERGY PYRAMID** | Energy pyramid  includes 4 trophic labels, example organisms, and energy label | Energy pyramid  includes 4 trophic labels with example organism | Energy pyramid  includes at least 3 trophic levels with example organism | Energy pyramid  needs trophic levels completed and/or example organisms |
| **FOOD WEB** | Food web contains a diverse mix of  producers & consumers, predators/prey, and  appropriate energy  arrows (15+  organisms) | Food web contains a mix of producers &  consumers, predators/prey, and appropriate energy  arrows (10+  organisms) | Food web contains both producers &  consumers, predators/prey, and energy arrows (7+  organisms) | Food web contains organisms linked by  energy arrows, needs more organisms and more  organization (<5  organisms) |
| **EXPLAIN HOW 2**  **BIOTIC FACTORS**  **WILL BE AFFECTED** | Student explains how 2+ factors will  be influenced with evidence of impact. | Student explains  how 2 factors will be  influenced with evidence | Student explains how factors will be  affected by human impact | Student does not explain why/how  factors will be affected by human development |
| **EXPLAIN HOW 2**  **ABIOTIC FACTORS WILL BE AFFECTED** | Student explains  how 2+ factors will be influenced with evidence of impact. | Student explains  how 2 factors will be influenced with evidence | Student explains  how factors will be affected by human impact | Student does not  explain why/how factors will be affected by human development |
| **UNDERSTANDING**  **OF GLOBAL WARMING AND APPLICATION** | Shows strong  understanding of gases and global warming impact on ecosystems locally and globally | Shows  understanding of gases and global warming impact on ecosystems | Shows  understanding of gases and global warming impact on the environment in general | Shows some  understanding of gases and global warming impact on the environment in general |
| **SOLUTION TO REDUCE IMPACT** | Student presents a realistic solution  with an action plan to directly reduce human impact. | Student presents a solution with a plan  to directly reduce human impact. | Student presents a solution with a plan  to reduce human impact. | Student presents an idea that may reduce  human impact. |
| **DECISION ON**  **CONSTRUCTION** | Student takes a view  and supports with 5 pieces of evidence. | Student takes a view  and supports with 4 pieces of evidence. | Student takes a view  and supports with 3 pieces of evidence. | Student does not  choose 1 view or does not provide enough evidence. |